These Hamilton recurrent zones rarely occupy over a couple of feet thickness. They are more conspicuous in the eastern than in the western parts of the quadrangle. In them the Hamilton species are often quite abundant, to the almost total exclusion of other species. Some slabs were obtained from actual outcrops on which nothing distinctively Chemung was apparent.

Near the top of the Chemung formation of the quadrangle, in the townships of the southern part of the Waverly quarter sheet are some distinct conglomerates with a fauna diverse from that of the Chemung which appears above as well as below them stratigraphically. The conglomerates are quite local, as shown by their non-appearance at the same altitude in some hills not far distant from those in which they were seen. In several parts of the quadrangle local limestone bands were seen, reaching a thickness of over a foot in some cases.

On the geological map of the state published by the State Geologist in 1894 a line is drawn between Hamilton and Portage, but as to which side of the Tully or Genesee no indication is given, and in the legend the Portage covers lower Chemung and Ithaca. In the revision of that map published in 1901 the outcrop of the Genesee is indicated, this is followed by the Portage in the western part of this region and over the quadrangle in part. In the eastern part the Ithaca rests upon the Genesee, thus making the Portage and Ithaca to occupy the same stratigraphic interval. Further east, in Chenango County and beyond, the lower half of this interval is indicated as Ithaca, and the upper half as Oneonta.

The upper line is drawn in the 1894 map between the Portage and Chemung; in the 1901 map between Portage and Chemung for the western half of the Watkins Glen quadrangle, and for the eastern half between the Ithaca and Chemung.

The result of the summer's work clears up both of these lines, showing the Ithaca to be a member of the Portage formation, as was first pointed out in Bulletin 3 of the U. S. Geological Survey in 1884, where also it was then indicated that the Ithaca is not the lower part of the Chemung (as was claimed by Hall in 1843) but is separated from its base by an upper part of the Portage, of several hundred, now shown to be approximately 600, feet of strata.

H. S. W.

CURRENT NOTES ON METEOROLOGY.

METEOROLOGICAL SOCIETY OF JAPAN.

NUMBERS 5 to 8 of the *Journal of the Meteorological Society of Japan,* recently received, show encouraging signs of the continued activity of that scientific body. The society was founded in 1882, and numbers now more than 260 members. The language used in the *Journal* (now in its twenty-second year) has hitherto been exclusively Japanese, but in the future it is intended to insert articles on Japanese meteorology, as well as on other scientific matters, in English, French and German. The *Journal* is published by the editorial committee of the society, with headquarters in the Central Meteorological Observatory in Tokio. The title pages of the separate issues of the *Journal* are printed in English, and the list of papers shows a considerable range of interesting topics, *e. g.,* 'Cloud Cap on Mt. Fuji,' 'On the Stationary Low Pressure Area in Formosa,' 'Storms in the North Pacific Ocean in April, 1903,' etc.

PROTECTION OF PEACH TREES FROM FROST.

IN Bulletin 80 of the Agricultural Experiment Station of the Agricultural College of Colorado (1903) a description is given of the new method of protecting peach trees from frost by 'laying down.' This was first tried in the fall of 1896, at Cañon City, and has proved very successful. Early in November (at Cañon City) the trees are put into winter quarters. The earth is removed from a circle about four feet in diameter around the tree, and water is turned on. When the ground is saturated, the trees are worked back and forth, and are finally pushed over, with comparatively little injury to the roots. Then the limbs are brought together by a cord, and burlap, covered with earth, is put over them. In the spring, the covering is gradually

loosened, and later removed; then the trees are raised and propped up.

THE METEOROLOGY OF THE SÄNTIS.

HANN continues his valuable studies of mountain meteorology in a publication entitled 'Die Luftströmungen auf dem Gipfel des Säntis und ihre jährliche Periode' (*Sitzungsber. Wien Akad. Wiss., math. naturwiss. Kl.,* CXII., Abth. IIa, 1903, pp. 42), the Säntis being one of the most important mountain observatories of Europe. Fifteen years (1886–1900) of hourly observations of wind are discussed in detail, and compared with similar records at lower levels. In winter the mean wind direction is northeast; in summer nearly due west; in autumn (September-November) south to southeast. Southwest is the most frequent wind direction.

SOUTH AFRICAN METEOROLOGY.

SOUTH AFRICAN meteorology is beginning to make encouraging progress. Three recent papers, by J. R. Sutton, have been published in the *Transactions of the South African Philosophical Society,* Vol. XI., Part 4, and Vol. XIV., Parts 1 and 2, under the titles 'Some Pressure and Temperature Results for the Great Plateau of South Africa,' 'Results of some Experiments upon the Rate of Evaporation' (at Kimberley) and 'An Elementary Synopsis of the Diurnal Meteorological Conditions at Kimberley.' Mr. Sutton, who is already known for previous meteorological work at Kimberley, is in charge of the meteorological station of the De Beers Consolidated Mines. R. DEC. WARD.

THE MISSOURI BOTANICAL GARDEN.

ADVANCE proofs of the fifteenth administrative reports on this institution, which have been received from its director, show customary growth and activity. In 1903 $27,272.48 was expended in maintaining the garden itself; $3,085.69 was spent on the herbarium; $4,239.85, on the library; $5,325.98, on the office; $967.68, on research; and $1,307.87 for the training and care of garden pupils. For improvements of the grounds and buildings $1,954.35 was spent; a fire-loss to the plant houses and collections led to the expenditure of $2,033.40; $481.17 was spent on the preparation and equipment of a phyto-chemical laboratory, and the cost of publications was $1,849.16.

The director's report combines a summary of progress for the past five years with the details for 1903, and the liberal use of coordinate curves makes the growth in all departments evident at a glance. An inventory at the end of the year showed that 11,357 distinct species or varieties were then in cultivation, an increase of 41.8 per cent. for the last five years. The visitors for the year numbered 79,039, and their distribution by months forms an interesting curve of seasonal out-of-door life in St. Louis. The herbarium now contains 465,205 specimens, valued at $69,780.75. Of these, 37,408 were incorporated last year, and the growth for the last five years amounts to 51.3 per cent. of the number reported at the end of 1898. The library contains 42,262 books and pamphlets in nearly equal numbers and 311,218 index cards, and is valued at $74,472.90. Its growth for the last five years is shown to be 27.7 per cent. The serial publications now received number 1,185, an increase of 27.4 per cent. over the number received five years ago.

The continued use of the equipment of the garden for research by its employees is noted, and the statement is made that "in every feasible way the library, herbarium and living collections are made useful to investigators, whether connected with the institution or not: when they can be used on the spot, every possible facility for their use is given visiting botanists: when this is not possible they are sent to trustworthy persons or institutions, when their safe return is guaranteed; and, except for specimens or books of especial value which could not be replaced in case of loss, or those in constant use, the garden has always stood ready to place its library and collections for a reasonable time at the disposal of botanical departments of colleges, or of capable investigators not having official connection with the centers of learning."

Small but satisfactory results are reported in the Shaw School of Botany, through which